

SMARTFLEX^{EmS}

Compact solution for flexural
testing of advanced materials



Compact, smart, high performing

Fully automatic flexure testing machine for displacement and strain control tests.



SMARTFLEX EmS is our innovative 100 kN Load Frame, a compact and versatile tester specifically designed for laboratories wanting to perform fully automatic displacement and strain control tests in a small space. SMARTFLEX benefits from the environmentally-friendly Electromechanical Servoactuation (EmS) technology that limits on-going maintenance, minimizes noise output — without any compromise on performance.



Environmentally Friendly and Quiet

EmS technology does not need large and noisy air compressors or hydraulic pumps, drastically reducing noise levels and general maintenance.



Compact and Smart

The reduced dimensions coupled with 100 kN capacity enables to perform the most advanced tests in a small space, ensuring high accuracy.



Fully Automatic

The EmS machine automatically performs displacement controlled or stress-controlled tests and record all test data; all without any interventions from the operator.



High Performing

The easy test set-up as well as the rapid approach and return functions shortens test performance and streamlines the testing process.

Stand alone equipment specifically designed for deformation/strain controlled tests for high ductility material as FRC (Fiber - Reinforced Concrete).

Compact and reliable

The compact design and the presence of wheels makes it simpler to position the machine in small spaces (as mobile or temporary laboratories) without any compromise in measurement accuracy, thanks to the stiff frame and the 100 kN capacity

Innovative design

The smart reverse design of the servoactuator, coupled with pendular roller arms, makes any sample and transducer positioning easier.

Adaptable to any sample shape

The adjustable height of the rollers allows to test small beams covering samples with different shapes.

Compliant to the most important Standards

EN 12390-5 | EN 14651
ASTM C78 | ASTM C1609

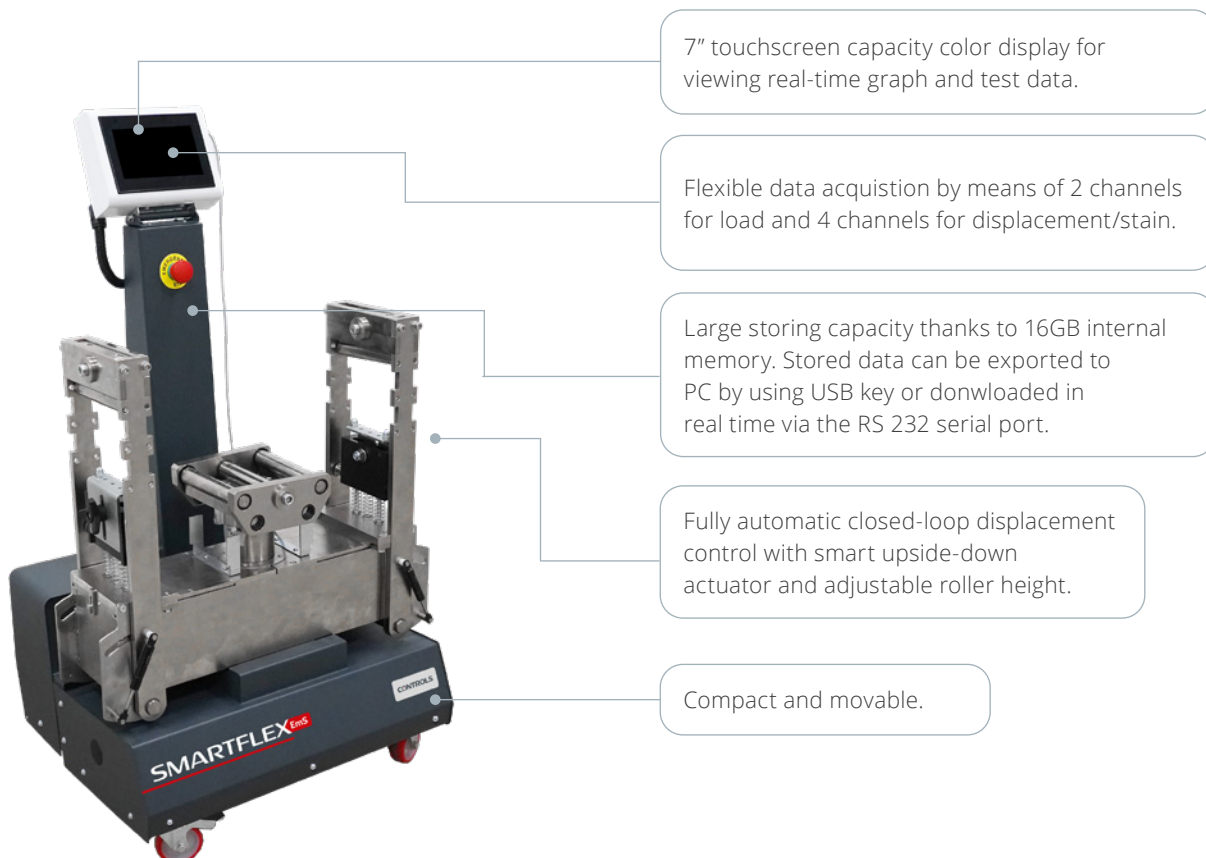
Easy test set up

The innovative design allows the user to set up the test in two easy steps reducing working times, thus increasing laboratory efficiency without losing accuracy and precision of the measurements thanks to the Closed-loop displacement control.



Two-step clamping system based on pendular rollers

Main Features



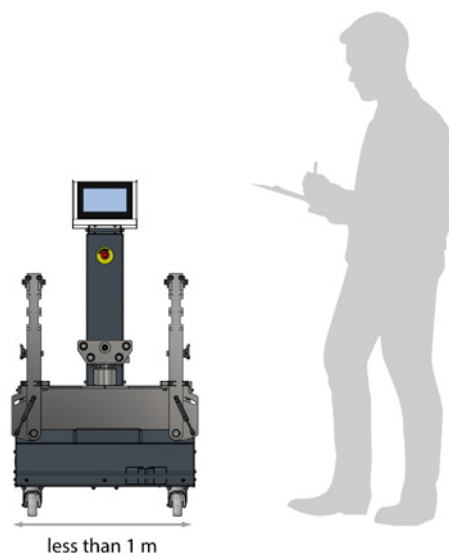
Step-Up your laboratory

Compact and accurate

Thanks to its compact design and the ability to be placed in small spaces, SMARTFLEX EmS is ideal for mobile or temporary laboratories wishing to perform displacement/strain controlled test on advanced materials as FRC.

Ideal for quality control

The reduced dimensions coupled with stiff frame and pendular roller arms enable to perform easily advanced tests reducing working time and test set up.



Advanced Electromechanical Testing

Upgrade your laboratory

SMARTFLEX EmS represents the latest step in the evolution of technology for characterizing high-preforming materials as Fiber-Reinforced Concrete (FRC).

Its compact design coupled with the innovative sample positioning system and the Electromechanical Servoactuation (EmS) technology make easy the execution of complex displacement test, even in limited spaces as mobile or temporary laboratories.



Deflection test on Steel Fiber Reinforced Concrete beams to EN 14651 [CMOD Method]

Fully-automatic

The test is carried out with a fully automatic closed-loop displacement control, requiring no user intervention during testing, so that even less experienced technicians can complete the most complex tests.

Plug and play

SMARTFLEX EmS can be considered a real plug and play solution for all that laboratories that need to test several FRC samples in a fast and accurate way, totally compliant with the most important standards.

Intuitive

The test profile is easy to set up thanks to its intuitive 7" touchscreen capacitive colour display in order to carry out tests according to the following standards:

EN 12390-5 | EN 14651
ASTM C1609 | ASTM C78

Focus on advanced test

Why perform displacement-controlled tests?

These tests are mainly performed to determine the ductility of advance construction materials, used for their superior capability to deform after first concrete matrix cracking.

These materials can include:

- FRC (Fiber-Reinforced Concrete)
- Structural specimens reinforced with carbon fiber fabrics or similar
- Composite materials

How the test works

Load applied to the specimen is gradually increased in order to produce a constant rate of deformation up to the peak load value and first cracking.

Afterwards, deformation is increased up to the required target, while the load is monitored to determine the material toughness.

The typical test result is the area subtended by the Stress-Strain diagram. Higher areas are obtained with materials with high ductility and toughness.

What system do you need?

Testing systems must have a very fast reaction times and an extremely accurate actuator to face the typical instability of the post-peak stage.

It must also be able to control the rate of sample deformation, avoiding an early specimen failure and consequent loss of test results.

Dedicated firmware and software

High control of displacement test

Integrated Firmware

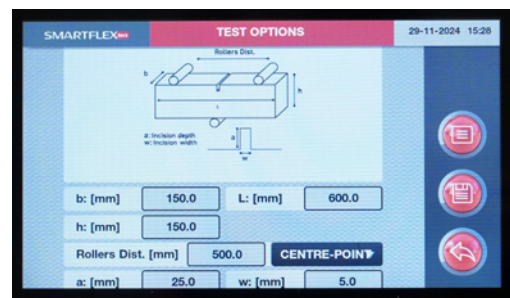
By adding accessories from the wide range available, the machine is equipped with a user-friendly Firmware to conduct various tests in accordance with major international standards.

The Firmware allows users to select specific flexure and displacement tests for beam samples, as well as to monitor test progress through graphical displays.

The intuitive interface enables users to quickly configure test parameters. Featuring a 7" color display, the graphs are clearly visible and updated in real-time during test execution.



FW - Clear and intuitive menu with pre-set automatic procedures



FW - Easy setting of sample and test parameters

Dedicated Software

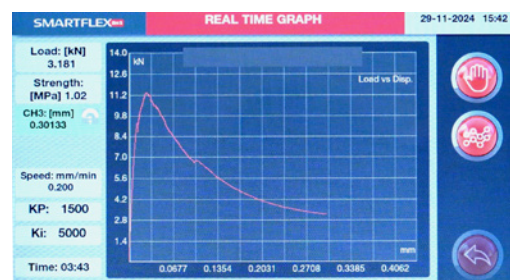
D-Control software package is the module for Displacement Controlled Tests allowing:

- Pre-set test following the most common standards as:

EN 12390-5 | EN 14651

ASTM C78 | ASTM C1609

- Automatic calculation of test results
- Customizable test procedure allowing desired loading history
- Possibility to change in real time the test parameters: target load/displacement, control variable, test speed.



FW - Real-time display of strength, displacement and time



SW - Deflection test on Steel Fiber Reinforced Concrete beams to EN 14651 [CMOD Method]

Ready to connect

Take control of your data

SMARTFLEX EmS, via DATAMANAGER software, is compatible with cloud services, providing:

- **Better communication with any LIMS** through JSON protocols, allowing easy and automatic storing of each test in the laboratory database. No more human error and waste of time in transferring the information.
- **Cloud storage** with different access level of every test performed, results and reports: as soon as the test is stored, you can gain access to the report from anywhere in the world.

 **Contact our experts for more information**

Technical Specifications

Type of control	Displacement and load
Channels	6 (2 for load, 2 for load and displacement/stain, 2 for displacement/strain)
Data download	USB port for data storage or firmware upgrades, Ethernet for PC and RS232 serial port
Channel resolution	524.000 points high-resolution / stability analogue channels.
Memory	Internal 16 GB SD card
Control frequency	250 Hz
Remote control	with optional Software
Compression capacity	100 kN
Horizontal daylight	950 mm
Overall dimension (WxDxH)	630 x 520 x 1190 mm
Net weight (machine only)	150 kg
Single-phase line voltage	220-240 V 110 V
Frequency	50-60 Hz 60 Hz
Power	400 W

Ordering Information

50-C1292

Smartflex, EmS three points flexure testing machine, 100kN, brushless motor and 7" touchscreen display. 230V - 50/60Hz - 1 Ph

50-C1294

Smartflex, EmS three points flexure testing machine, 100kN, brushless motor and 7" touchscreen display. 110V - 60Hz - 1 Ph

Accessories

50-SW/DC

Software module for Displacement Controlled Tests

Set up for EN 14651

82-P0331/E

High precision displacement transducer to measure Crack Mouth Opening Displacement (CMOD)

82-P0331/E1

Fixing jigs 20 pcs for bottom transducer positioning

Set up for ASTM C1609

50-C1292/1

Deflection measurement kit including auxiliary frame

50-C1292/2

Kit with rollers for four points flexure testing

82-P0331/C

High accuracy displacement transducer 10mm travel (2 PCs needed)

CONTROLS Customer Care

As one of the longest established manufacturing companies in the world of Construction Materials Testing solutions, we are dedicated to supplying high quality, accurate, affordable, easy to use systems.

As a valued customer of CONTROLS, you will receive continuous, expert support and advice for your equipment. Furthermore, we can offer full installation and training in the correct operation of your CONTROLS equipment.

For support from our expert Customer Care Team, contact your local CONTROLS office / distributor or email customercare@controls-group.com.

For more information, please visit www.controls-group.com.

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